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**Abstract:**

*EDS, Bank One and Norwest Corp. are collaborating in the development of a fully integrated, fourth generation database system, to be a major retail bank processing system for large financial institutions. The "Future System", which EDS will own and market, is data-oriented rather than process-oriented. The system emphasizes basic data, integrating and consolidating previously separate databases into a common, shared database. It will enable banks to access and evaluate a customer's total banking relationship.*



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## Core Banking Solutions

How Compaq can help bring your bank into the new real-time banking environment

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Market factors such as e-commerce, retail channel proliferation, and the increasing use of electronic transactions are forcing financial institutions to rethink their core processing strategies. Real-time core banking is fast becoming a requirement for handling the myriad new business processes being used by today's customers.

In banking, tremendous change is occurring in the core production and transaction processing systems that handle lending, deposits, insurance, securities, customer information files, and financial reporting. New market factors such as electronic commerce and banking channel proliferation are now requiring banks to re-evaluate their existing systems architecture and infrastructure. The rapid shift toward electronic transactions in the form of automated teller machines (ATMs), debit cards, and home and wireless banking has made real-time core banking systems a requirement to support the up-to-the minute balance reporting requirements that the older batch-oriented legacy systems cannot support.

### **The emergence of core banking**

Rapidly changing technology and customer requirements have pushed banks to look for better ways to handle their customers' new business processes. Increasingly, banks worldwide are implementing real-time core processing systems.

Many banks have attempted to compensate for limitations in core legacy systems by surrounding these systems on the front end with modern user interfaces and on the back end with data warehouse and executive information applications. While offering some improvement in legacy core systems, these efforts have not provided banking organizations with the necessary infrastructure to create the innovative products and services required to preserve and expand market share. Additionally, these changes have not addressed the risk inherent in having duplicate data and function in a real-time world. Duplicate functions grew out of the need to build an environment to support changing business needs. A good example exists within the typical ATM system, which holds a customer's balance in a memo post file during the day and is integrated only at the end of the day with other memo post balance files from across the bank.

Many large banks providing alternatives to their traditional offerings have embraced the recent trend toward direct or "branchless" banking, which provides services through some combination of delivery channels including the Internet, call centers, and ATMs. In addition to savings achieved through avoiding traditional brick and mortar costs, direct banks also benefit from reducing check-processing costs, with electronic payment being the dominant method of payment for deposit accounts of direct banks.

The implementation of new real-time capable core systems to support direct banks offers customer benefits as well. Use of real-time processing allows customers to receive instant feedback that their transactions have been successfully completed. This in turn facilitates knowing an actual intra-day balance that can be invested through a trading facility in the remote banking offering.

European banks and U.S. thrift institutions have been quicker to adopt real-time core processing systems than other segments of the market. Many European banks are using real-time core systems based on the volume of electronic payments they process as compared with traditional paper checks. Additionally, according to Tower Group Research, the replacement of 11 currencies with the euro has accelerated the rate of in-country mergers and is expected to force cross-border acquisitions resulting in the emergence of large-scale "eurobanks." Among the many challenges facing these larger institutions will be the need to process an increasing number of accounts and provide 24 x 7 customer access and service. To continue to compete effectively, many of these "eurobanks" will have to upgrade or replace existing core systems to address significant increases in volume.

As banks and the services offered have evolved over time, so have the capabilities of core processing systems. An important trend among packaged systems offered to the marketplace has been that of expanded functionality. Core systems that traditionally handled deposits, lending, and reporting have added capabilities such as customer relationship management (CRM), wealth management, and remote banking to address the changing marketplace.

In addition to market and delivery factors impacting core systems, advances in technology have had a significant influence on systems architecture. Until recently, the mainframe was the only platform with sufficient scalability to perform processing for mid-size to large banks. Large systems were required for banks to process daily transaction volumes during its nightly batch update. This was true despite the fact that banks have long favored open architectures that allowed for the use of best-in-class third-party systems, which can be more easily integrated. However, significant increases in midrange processing power now allow all but the largest banks to utilize client server architectures.

#### **A new approach to retail banking: Integrated retail delivery**

Core banking is just one part of the fairly complex architecture of banking today. Over the past few decades, retail banking has evolved from a relatively simple branch-based delivery model to a very complex, multichannel environment. Today's bank environment includes several diverse delivery channels, including ATMs, point-of-sale (POS) devices, branches, kiosks, Internet banking, cell phones, personal digital assistants (PDAs), and call centers. The key challenge is to provide the bank customer with complete and consistent service regardless of the channel chosen. Simply put, the bank must deliver all banking products and services over all delivery channels. This can only be accomplished through a fundamentally new approach based on

- Integration of delivery channels to core systems and customer data
- Integration of delivery channels with each other
- Integration of new channels, services, and technologies, as quickly as they evolve
- Availability of all products and services across all channels

Compaq has developed an integrated retail delivery (IRD) solution that brings together all aspects of the retail delivery infrastructure, automates CRM and marketing, and provides unparalleled performance in hardware and software platforms and services. This solution ensures that each of the bank's delivery channels can serve the bank customer anytime, through any channel.

#### **Compaq core banking solutions**

By adopting Compaq solutions, banks worldwide have improved their service offerings and reduced transaction costs while making banking easier and more personalized for customers.

Relying on Compaq core banking solutions, a financial institution can achieve these key benefits:

- *Reduced transaction costs.* Real-time core processing eliminates the need to double post transactions as is required by memo-post batch systems.
- *Increased customer satisfaction.* Customers receive instant verification that their transactions were successfully completed, as well as up-to-the-minute account balance information.
- *Rapid implementation of e-banking services.* Compaq's core banking solutions allow financial institutions to rapidly deploy Internet banking services and support their growth over time.
- *Management of ever-increasing transaction volumes.* Real-time core banking solutions allow financial institutions to effectively handle increases in transaction volumes despite the narrowing of batch update windows as banks continue geographical expansion.

#### **Solution components**

The major components of Compaq's core banking solutions are

- Compaq servers and desktop computers

- Core banking applications from Compaq and partner companies
- Comprehensive implementation services by Compaq Services

### **Superior hardware offerings**

For many years, Compaq has had a very strong relationship with Microsoft. This has resulted in superior compatibility between Compaq hardware (at all levels) and Microsoft operating systems, applications, and application software. Compaq provides end-to-end support for Windows NT® Server, from powerful servers to desktop PCs to handheld devices. The Windows NT Server platform—fast becoming the operating environment of choice for business—offers banks the reliability, scalability, and cost savings required to merge legacy systems with emerging technologies.

Compaq offers a comprehensive 8-way *Compaq ProLiant* solution containing the Profusion symmetric multiprocessing (SMP) architecture, co-developed by Compaq and Intel. This architecture provides near linear scalability for 8-processor servers running Windows NT 4.0 and Windows® 2000 systems. This scalability, together with the exceptional performance of the memory and I/O subsystems, enables these systems to maximize the productivity of the most demanding enterprise applications, including core banking and e-commerce.

Compaq also offers a full range of Compaq *AlphaServer* systems, providing business-critical 64-bit computing on a choice of highly available operating systems. Compaq *Tru64 UNIX®* systems provide the highest level of performance and scalability for businesses requiring interoperability between UNIX and Windows NT systems (for example, as may be needed between core banking and IRD applications). The Compaq *OpenVMS* platform provides an enterprise-caliber operating system that offers business-critical, ultra-high-availability, 24 x 7 computing for key applications, plus tight integration with Windows NT. The *OpenVMS* platform offers immunity to both planned and unplanned downtime with proven, unmatched, continuous computing, including disaster-tolerant, multisite clusters.

Additionally, Compaq *NonStop™ Himalaya* servers—recognized as the leading platform for scalable, business-critical computing for more than 20 years—have been chosen by leading banks throughout the world as an ideal platform, delivering the highest levels of availability and reliability for transaction processing and custom-developed core banking applications.

Compaq core banking solutions offer proven banking applications from strategic Compaq partners and combine these with best-in-class enterprise servers and professional services. The result is a turnkey core processing infrastructure that is an integral part of the bank's IRD architecture. Compaq solutions enable banks to efficiently re-establish personalized relationships with customers—and at the same time continue to gradually reduce the overall costs of branch operations.

### **Core banking applications**

#### ***PROFILE/Anyware from Sanchez***

*PROFILE/Anyware* running on the *Tru64 UNIX* and *OpenVMS* systems is a multicurrency, multilanguage, multibank, integrated solution for large bank core processing. The system supports a full range of customer, deposit, and loan applications and provides online and batch services to meet any financial institution's transaction processing and financial management requirements. *PROFILE/Anyware* has been successfully implemented in numerous financial institutions that require real-time core processing to support Internet banking services.

*PROFILE/Anyware* operates in a silo-free environment, with real-time, 24 x 7 processing, using a high-performance database. The open-architecture, client/server design enables the system to run on a variety of operating platforms and accept and process data regardless of the channel on which the information is received. In addition, *PROFILE/Anyware* is compatible with a wide range of proven technologies and best-in-class, third-party applications for unparalleled versatility and operating efficiency. Furthermore, *PROFILE/Anyware* is customer centric, providing complete banking relationship management and management reporting capabilities.

#### ***TCBS from Open Solutions Inc.***

The Complete Banking Solution (TCBS) allows mid-tier financial institutions to conveniently manage operations and information in one complete software package. Using client/server technology, TCBS uses Intel® Pentium® system-based servers and client computers to share information with a wide area network. System users communicate directly with an Oracle® relational database to access customer accounts, product information, interest rate information, and other bank-related data. Transactions and updates to the database are processed immediately.

The Windows system-based TCBS software design uses an advanced form of database design to mirror the way a bank does business and can easily accommodate any changes in the future.

The speed, data capacity, and integration of TCBS software makes prospecting for new customers and cross-selling to existing customers easy to accomplish.

TCBS software features an extensive deposit and lending system, a fully integrated teller and platform system, and a vast amount of marketing-focused information based on a cost-saving architecture.

**Ovation from Prologic Corp.**

Since 1984, Prologic has been an innovator in financial software and continues to play a leadership role in shaping the future of banking technology. More than 300 of the world's financial institutions utilize Prologic products. Ovation is an integrated core banking system that features Internet banking and powerful CRM capabilities that support one-to-one marketing practices for building customer loyalty and increasing profitability.

Ovation is truly a "front-to-back" solution, providing high-performance online transaction processing, front-end retail branch applications, and support for the various delivery channels and e-commerce gateways. Ovation's innovative architecture supports ease-of-integration of third-party products and interoperability with legacy systems. Ovation's developer tools provide rapid application development capabilities, enabling banks to be fast-to-market with competitive new products and services.

The Ovation core banking system utilizes Windows NT servers and is deployed using a three-tier architecture, with clients and gateways forming the first tier, a middle tier acting as a transaction manager, and a database management system forming the third tier.

**Compaq NonStop™ Himalaya solutions**

Compaq NonStop™ Himalaya servers are recognized for their availability and reliability in powering high-end applications. In fact, many major banks and financial institutions—such as ANZ Bank, one of the largest banks in Australia—have developed customized core banking applications using the Compaq NonStop™ Himalaya platform. Compaq is currently working with leading core banking software providers to make available solutions running on the Compaq NonStop™ Himalaya platform.

**Implementation services from Compaq Services**

To ensure that your core banking system is implemented successfully, Compaq Services for the financial services industry provides support for the full systems life cycle in retail and wholesale banking, capital markets, and Internet finance.

A broad range of planning services includes identifying business goals, analyzing processes, and pinpointing weaknesses to help you eliminate chronic problem areas and assure a speedy and economical systems implementation. Implementation services range from installation, systems integration, and testing to production rollout, tuning, and staff training. Migration services offer assistance in moving from legacy systems to newer technologies with the aid of Compaq tools and expertise.

Compaq Services offers the best practices and most knowledgeable people for building, servicing, and managing Compaq NonStop™ solutions for banking. Offerings include

- Life-cycle services for planning, design, implementation, management, and support of scalable solutions and infrastructures
- Consulting services from a worldwide practice to help you build an online business and to design and implement a scalable, manageable infrastructure
- Business-critical services that ensure the highest levels of availability and reliability by Compaq NonStop™ systems
- Operations management and outsourcing services that offer the capabilities, capacity, and coverage to provide the agility to remain competitive
- Hardware and software technical support services to keep your organization online 24 x 7

**Major financial institutions rely on Compaq solutions**

Compaq has a strong record of success in the finance industry. Every day, Compaq servers process approximately 60 percent of the world's money (US\$1.7 trillion). Many of the world's largest financial institutions rely on solutions from Compaq, including Bank of America, Chase Manhattan, Capital One, Rabobank, Royal Bank of Canada, Sakura Bank, U.S. Bankcorp, and Wells Fargo Bank.

**Retail banking trends: Internet and e-commerce**

Perhaps the most defining technology driver for banks today is the growth of the Internet and the enormous new opportunities in Internet driven e-commerce.

The impact of the Internet on retail banking cannot be overemphasized. The new "on-line, real-time" environment fueled by e-commerce, including e-banking, will require a significant change in the underlying infrastructure of core systems forcing financial institutions to adopt real-time systems to keep pace. The Internet and e-commerce are more than a new delivery channel, they are

- A facilitator, in conjunction with automated marketing technologies, for new retail banking products and services
- A power that has the ability to alter the traditional competitive paradigm in banking of "bigger

- is better" for the delivery of financial services
- A platform that enables fundamental technological advancement that will radically change the bank operational infrastructure

The Internet is similar to other retail banking channels. When customers conduct business using Internet-based remote banking, it is essentially the same transaction as that performed at a branch or ATM, or through a call center or other retail delivery channel. While the Internet, in this case, appears to be another access point for traditional retail banking products and services, Internet video and audio technologies at the human interface make this channel unsurpassed in its ability to provide information and influence customer behavior.

### **Using automated marketing technologies**

The Internet and automated marketing technologies allow banks to offer personalized capabilities such as a "personal financial portal," or PFP. A PFP is a website that offers a broad array of customer-specific financial services and resources. Customers will demand, and banks can now offer, "home sites" for financial services. These portals will offer personalized one-stop shopping for all personal financial activities, including

- Traditional banking services (account balance and transfer, bill payment, and deposit and loan activities)
- Key general banking services, including stock and share activities, insurance, and tax processing
- Information-based services, such as comparative shopping, reference information, and education and advice
- Other services, including e-mail, financial forums, search engines, and online shopping

At a minimum, financial institutions will use PFPs to extend their brand and their business presence on the Web. The primary benefit of PFPs is that they drive add-on sales through the cross-selling of the institution's financial products and services.

### **Creating new partnerships**

The Internet also enables opportunities to create new types of partnerships. An excellent example of such a partnership is Compaq's Internet Commerce Co-branding program (Cobra). Cobra is a program that enables banks to become application service providers (ASPs) to their merchant customers. Cobra is a professional services-enhanced offering that provides the bank with a comprehensive set of co-branded e-commerce solutions and services to offer its merchant customers.

Banks can also partner with financial service providers to augment their core offerings. These partners, often in disparate locations, can create multiple new co-branded products and services through the Internet—or combine products and services seamlessly to appear as a single proprietary offering.

### **Changing the traditional paradigm**

The Internet changes the traditional competitive paradigm in banking, enabling banks to reach customers beyond traditional geographies. Undeniably, it allows customers around the world to have relationships with any financial institution. Now, for example, customers in Cape Town, Singapore, San Francisco, or Hanover can do business with a bank in Boston.

Furthermore, because the customer normally absorbs the cost of the transaction device (PC, handheld device, and mobile telephone) and the network, the cost per transaction via the Internet is appreciably lower than with other channels. Banks with an extensive Internet customer base will have considerable cost advantages.

The Internet, when incorporated with CRM technologies, facilitates the offering of new services and products. Integrating modern CRM systems for personalized marketing, banks now capture and integrate a "full view" of the customer and are able to "mine" data for meaning and appropriate actions. Banks can then develop one-to-one marketing and deliver the most suitable products and services. New products incorporating CRM and Internet technologies include electronic bill payment and presentment and wireless banking.

### **Leveling the competitive playing field**

The Internet doesn't discriminate between a big bank with billions, even trillions, of dollars in assets and a small bank with a few, if any, branches and ATMs. All banks' Web pages are equally accessible. Banks, large and small, are now empowered to compete on the basis of products and services, and on rates and customer service, not on the size of the balance sheet.

The Internet breaks down the traditional barriers that prevented customers from researching the most advantageous financial relationships. Customers are now able to "shop" online for the best rates on both asset and liability products and services. What's more, Internet technology facilitates the

customers' ability to transfer funds between institutions using "drag-and-drop" and browser technologies available on their desktops. The technology currently exists (although it may not yet be implemented) for customers, employing enabling software, to use intelligent agents to search for the best financial products and services (based on the customer's specific criteria) and automatically transfer funds between institutions—all without human intervention.

An example of institutions adopting fully the Internet paradigm is "branchless" Internet banks. These institutions challenge the concept that banks need a "real," or material, presence in order to transact business. Customers conduct banking activities exclusively over the Internet, through call centers, or via the mail. Because the Internet channel is the "low-cost" retail channel, the strategy of the Internet bank is to entice customers with higher deposit rates and lower loan rates that can be offered because of their low-cost infrastructure.

### **Enabling true IRD**

Finally, Internet technology promises to be a unifying force within the bank's operations, both for internal and external interactions. The Internet as a de facto communications standard, the Web browser as a display standard, and the Web server as the access point into the bank's operational systems are a powerful unifying architecture that enables true integrated retail delivery across all channels.

### **The Compaq solution**

With the dramatic expansion of the Internet and e-commerce in financial services, massive amounts of information must be brought together and managed. In addition, thousands of users may need to access this data at the same time. As financial Internet and e-commerce solutions grow in popularity, transaction volumes are likely to increase exponentially. This is one of the key reasons why real-time core banking solutions will become so critical to an institution's ability to handle the increased volumes.

Compaq platforms offer the performance, scalability, availability, data integrity, and security required by financial institutions and their customers. Compaq financial Internet and e-commerce solution servers are at the heart of critical applications relied on by securities exchanges, banks, and nationwide electronic funds transfer (EFT) networks.

Compaq personnel are skilled at implementing technology solutions for the Internet and e-commerce market. Compaq works closely with a broad spectrum of partners in the financial services industry, telecommunications industry, and other businesses and has developed best-in-class solutions that incorporate the fundamental strengths of Compaq platforms with the business capabilities requested by the market.

Because technological change is accelerating, Compaq is working closely with its IRD solution partners to continue to drive channel and product evolution. Compaq's IRD strategy will enable banks to respond to and adopt new technologies associated with e-commerce and the Internet to remain competitive.

### **Compaq Finance IQ Centers**

Compaq's comprehensive strategy for deploying integrated retail delivery (IRD) solutions revolves around the development of Finance IQ Centers. These centers enable Compaq and strategic partners to showcase IRD solutions, test system sizing and configuration, and assure smooth integration of all IRD components.

The Finance IQ Center (FIQC), located at Compaq European headquarters in Munich, Germany, is a model for other financial competency centers. At the FIQC, Compaq personnel work with customers and partners to conduct pre-installation sizing, configuration, integration, and "proof of concept" testing on a variety of Compaq hardware and software platforms. The FIQC is currently set up with all variants of the most advanced Compaq hardware. For high-load testing, the system can simulate both physical clients and concurrent virtual clients.

### **The Compaq advantage**

Compaq offers proven, real-time core banking solutions that reduce costs, manage increasing volumes of electronic transactions, and allow financial institutions to rapidly deploy e-banking services.

Compaq offers compatible best-in-class solutions from leading software vendors for each of Compaq's IRD initiatives. Each application is a leader in its region, so it is truly robust as well as comprehensive. Because each of these solutions is assembled and pre-tested in a competency center, customers are assured that their solutions are proven and compatible.

Compaq core banking solutions offer clear advantages over homegrown solutions. Most importantly,

they reduce risk, speed time to market, and decrease development and maintenance costs by incorporating accepted standards. The key competitive advantage over other solutions is support for multiple delivery channels, which gives the bank the freedom to extend its services, offer bank branding, and respond quickly to changing customer preferences.

Compaq Services can take full responsibility for the end-to-end implementation of the core banking solution. This provides the bank with consulting, integration services, and ongoing support. Implementation of Compaq partner solutions allows Compaq Services to deliver pre-integrated and pre-engineered software and hardware solutions complete with critical, predefined project implementation information.

This provides the bank with a single vendor that is totally responsible for any and all problems. Compaq Services will coordinate additional support teams and the efforts of the ISVs to present a unified face to the customer.

In addition, Compaq Services helps relieve the planning and implementation burden, freeing in-house personnel for other projects. Compaq personnel, with their in-depth experience with branch automation deployments, help minimize the many risks associated with a large technology migration.

Finally, Compaq believes that technological change is not continuing, it is accelerating. Compaq is working closely with its IRD and core banking partners to continue to drive channel and product evolution. The IRD strategy will enable banks to respond to and adopt new technologies associated with e-commerce and the Internet to remain competitive. From a retail delivery perspective, e-commerce and the Internet will play a dual role—both as an enabler of integrated retail delivery and as a driver of change. In this way, Compaq's integrated retail delivery strategies and core banking solutions are integrated to ensure success.

### Summary

The changing landscape of the financial services industry demands a one-stop source for integrated, multiplatform core banking solutions.

Today's changing financial environment, increased global competition, and emerging technologies such as the Internet have given rise to a new set of challenges for banks. One of the greatest of these challenges is to find a way to provide real-time core processing—supporting all delivery channels—to serve customers quickly and reliably.

A global leader in information technology and systems integration, Compaq serves hundreds of major banks worldwide, offering one-stop shopping for integrated retail delivery and core banking solutions. From enterprise servers, desktop PCs, and palmtop devices to world-class software applications, service, and support, Compaq provides a single source for integrated core banking solutions.

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